

**Information Needs Assessment and  
Web Application Specifications  
for the  
Long-Term Stewardship Geographic Information  
System Pilot Project  
at the  
U.S. Department of Energy Grand Junction Office**

**March 2002**

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## 1.0 Purpose

The purpose of this report is to identify the information needs and the functional requirements of an Internet-based geographic information system (GIS) for sites that have been transferred to the Long-Term Surveillance and Maintenance (LTSM) Program at the U.S. Department of Energy Grand Junction Office (DOE-GJO).

## 2.0 Project Background

The DOE Headquarters Office of Long-Term Stewardship (LTS) issued a call for pilot projects that would aid individual sites, especially closure sites, in resolving barriers to transitioning to LTS and would help resolve LTS implementation issues across the DOE complex. In response to this call, DOE-GJO submitted a proposal to address the LTS implementation issue of timely and meaningful stakeholder communication. We proposed an Internet-based GIS for the sites currently in the LTSM Program at the DOE-GJO.

As sites transition to stewardship and are assigned to the LTSM Program, technical, operational, and monitoring information continues to be of interest to the various stakeholders including DOE, regulatory agencies, and LTSM Program staff, and the public. Several related studies have been completed or are under way that address establishing a better means of communicating environmental information to stakeholders (the DOE Brookhaven National Laboratory's *BNL Landtrek Stakeholder Outreach Project Recommendation Report*, December 2000) and the DOE Mound Plant's *Mound Site Assessment of Post-Closure Data Needs*, December 2001). These sites also have identified web and web-based GIS solutions as potential communication vehicles.

## 3.0 Summary

The following general conclusions are based on the information needs presented in Section 4.0 and the functional and conceptual design in Section 5.0:

- Significant interest exists to make information pertaining to compliance and monitoring activities at the LTSM Program sites available on an Internet-based GIS website.
- Timely availability of dynamic (current) spatial data associated with a site is of particular interest.
- Special information requirements resulting from unique site monitoring or maintenance activities exist.
- User information needs and the utility offered that an Internet-based GIS may vary, depending on the audience.
- The long-term viability of an Internet-based GIS will hinge on the cost effectiveness and timeliness of new data being made available.

Personnel from the Colorado Department of Public Health and Environment have offered to participate in this effort based on their level of interest expressed in the project, familiarity with Internet-based GIS technology, and direct involvement with multiple sites currently in the LTSM Program. One Colorado Uranium Mill Tailings Remedial Action (UMTRA) site will be selected for the initial prototype.

## 4.0 Information Needs

### 4.1 Information Needs Evaluation Process

A list of representative stakeholders was developed and a questionnaire was prepared. The selection of stakeholders to receive the questionnaire was based on input from LTSM Program and DOE GJO staff members. The primary criterion was that an individual needed to have a vested interest in one or more of the LTSM Program sites or was currently involved with LTS activities. Questionnaire recipients included contractors, DOE personnel, regulators, lawmakers, and other members of the public.

Recipient Type	Number Receiving Questionnaire	Number of Responses	Percent Responding
Contractor	20	3	15%
DOE	15	6	40%
Regulator	19	12	63%
Other	31	3	10%
Total	85	24	28%

The questionnaire is presented in Appendix A–1. The list of questionnaire recipients is included in Appendix A–2. Questionnaire responses are discussed in the following section.

### 4.2 Information Needs Assessment Results

Questionnaire responses were compiled and are presented in Appendix B–1 (Response Summary Sorted Alphabetically by Feature Description), and in Appendix B–2 (Response Summary Sorted by Feature Rank). The rank was determined by summing each of the priorities multiplied by the number of responses at the priority. Using this approach, the following features and information were determined to be of greatest need:

1. Monitoring Locations (monitor wells, boreholes, surface sample/air monitoring locations)
2. Site Boundary
3. Plume (extent of boundary or concentration contours)
4. Topographic Contours
5. Disposal Cell Boundary
6. Photographs (current and historic)
7. Groundwater Compliance Monitoring Network
8. Parcel, DOE-Acquired Tract, or Lease Boundary

9. Institutional Control Boundary
10. Cell Performance Monitoring Network
11. Monitoring Well Lithology and Completion Logs
12. Aerial or Satellite Imagery
13. Potentiometric Surface

It should be kept in mind that this needs assessment covered a broad spectrum of responses, each having special information requirements. Also, some sites in the LTSM Program may have unique, dynamic conditions and resulting needs that the above methodology does not identify. An example is the pumping of water out of the disposal cell at the Rifle, Colorado, UMTRA Title I Disposal Cell. Special information requirements and unique site conditions will have to be addressed in future phases of this project.

The information needs assessment responses highlight the basic static features most commonly needed (site boundary, disposal cell boundary, monitoring locations, etc.) and the dynamic data commonly needed that are associated with the site (plumes, site inspection photos, potentiometric surfaces, etc.). Groundwater monitoring at these sites is primarily performed for one of two reasons: (1) cell performance monitoring, usually at a relocated disposal site, or (2) groundwater compliance monitoring, usually at former ore-processing sites. At some former ore-processing sites where residual contamination exists, groundwater monitoring data and water level measurements will tend to be more dynamic and of greater interest. See Appendix D for a listing of the sites and locations of residual contamination.

Many interesting issues were expressed in the comments received. The potential users of an Internet-based GIS varies, and the way information is needed and used emphasizes that one standardized solution is not going to serve all needs. Some issues can be addressed through a well-designed user interface based on information needs and an understanding of how an LTS GIS will be used. The need for some coordinate system flexibility and the use of standard coordinate systems were also made apparent.

The long-term viability of an LTS Internet-based GIS will most likely hinge on the cost effectiveness of the underlying data management and the ongoing operation and maintenance of the information on the site. As one respondent noted, data maintenance can be expensive. Updating dynamic information on this site must be made as automatic and seamless as possible. It is believed, based on the comments received, that the greatest long-term value of this GIS will be the timely delivery of dynamic data.

Several comments involved security and the level of detail that is appropriate for the general stakeholder. These factors must be considered when final decisions are made regarding the information that is to be made available and during the web application design. Public Affairs, Security, and Information Technology staff members at the GJO, representing DOE and the contractor, will be involved in the development and final deployment of the web application to ensure security issues are appropriately addressed. It is believed that the features and information determined to be of greatest need will pass the security test because this same information is made available in annual compliance reports.

Selected respondent comments are included in Appendix B-3.

## **5.0 Web Application Specifications and Conceptual Design**

### **5.1 Web Application Specification Process**

Community outreach and data needs reports issued by Brookhaven National Laboratory and the Mound Plant were reviewed. Environmental and other GIS-based websites were also identified and reviewed. Websites included publicly accessible sites and the demonstration system being developed at Brookhaven National Laboratory. These sites were reviewed for information content, information presentation techniques, navigability, general user interface, and extent of customization. Information about these websites and general comments about each is available in Appendix C. Comments on these websites were solicited primarily from LTSM Program staff. This input was also taken into consideration in the following specification and conceptual design sections.

### **5.2 Web Application Specifications**

#### ***General***

- Fully integrate the LTS GIS into the existing LTSM Program website.
- Provide for easy addition of sites as they are transferred to the LTSM Program.
- Provide an opening introductory screen that describes the purpose of this website with links to resources such as instructions, glossaries, and contacts.
- Provide users with the option to submit comments or questions regarding the website.
- Provide general- and context-sensitive help throughout the system.
- Provide links to other websites as appropriate.
- Provide standard navigation and map tools, including zoom in, zoom out, pan, identify, and measure.
- Provide standard feature control so users can turn on and turn off data layers of interest.

#### ***Security***

- LTSM Program management, Public Affairs, Security, and Information Technology staff members at the GJO, representing DOE and the contractor, must approve the information types that will be made available.
- Server should only contain/access copies of the electronic information, not the original data. This prevents attacks over the web from destroying the information.

#### ***Functionality***

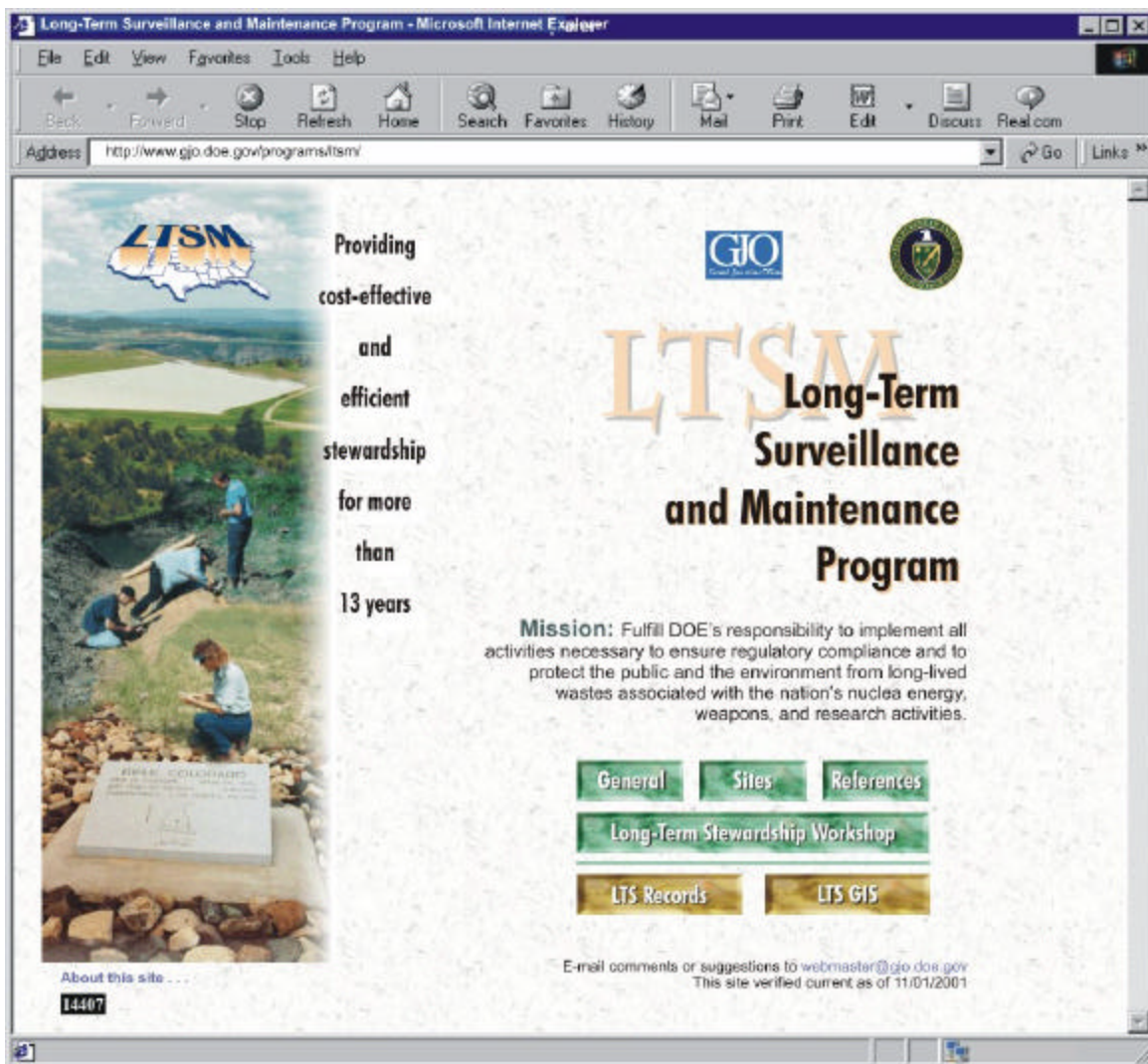
- Allow key information about the site to be displayed on the site overview map.
- Display only validated data.
- Allow different types of monitoring locations to be displayed.

- Display groundwater monitoring locations based on cell performance, groundwater compliance, or other factors.
- Provide query tools that dynamically chart and report data for the analyte of interest for a given monitoring location.
- Use symbols, where appropriate, based on regulatory standards.
- Allow generalized monitoring data queries for the site to be performed and an option to download data if desired, (future).

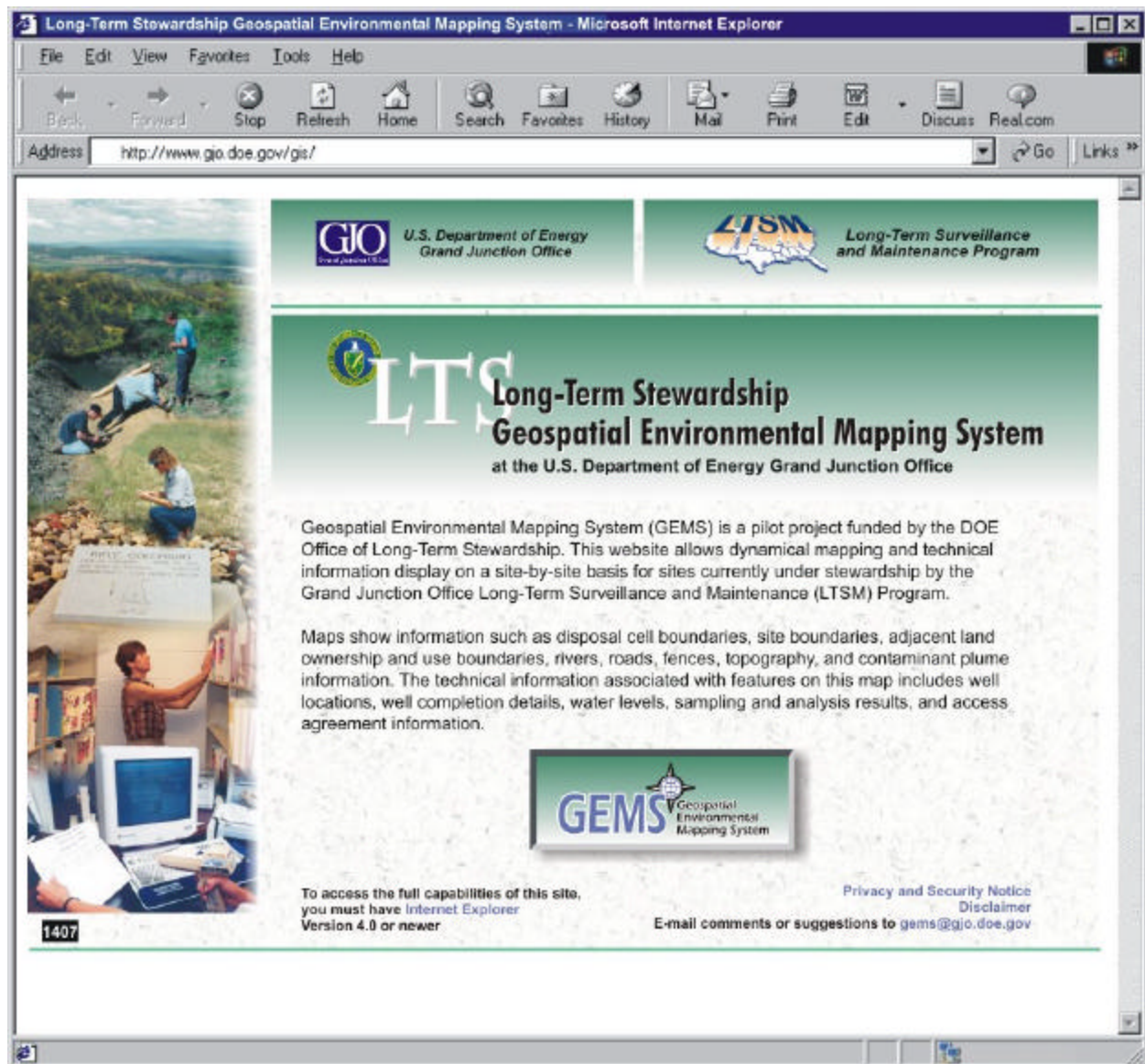
### 5.3 Web Page and Application Conceptual Design

The following figures illustrate the conceptual design for the Geospatial Environmental Mapping System or GEMS.

1. GEMS will be launched from the LTSM Program home page by pressing the “LTS GIS” button.



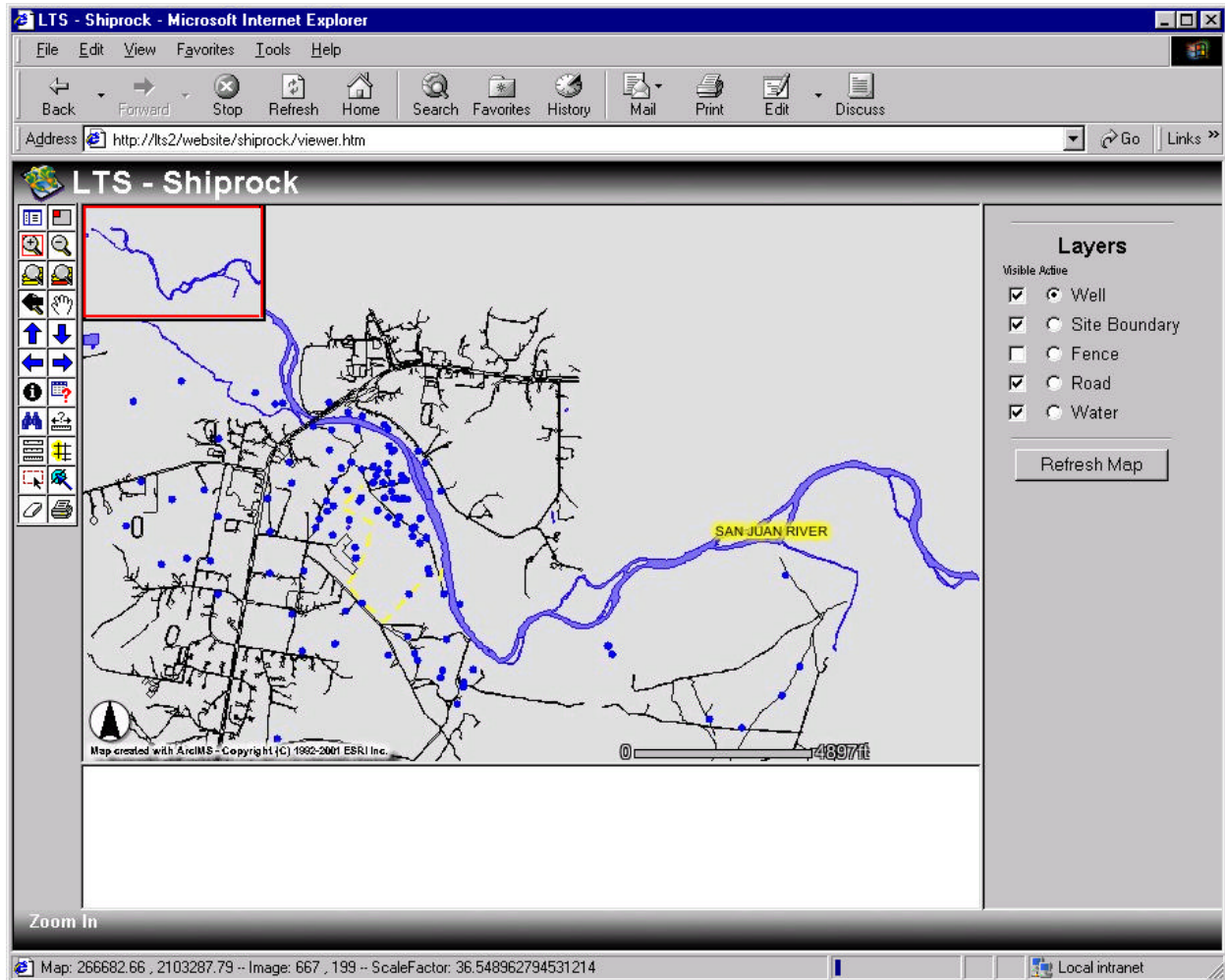
2. The introductory page will be presented. Pressing the GEMS button takes the user to a map of the United States.



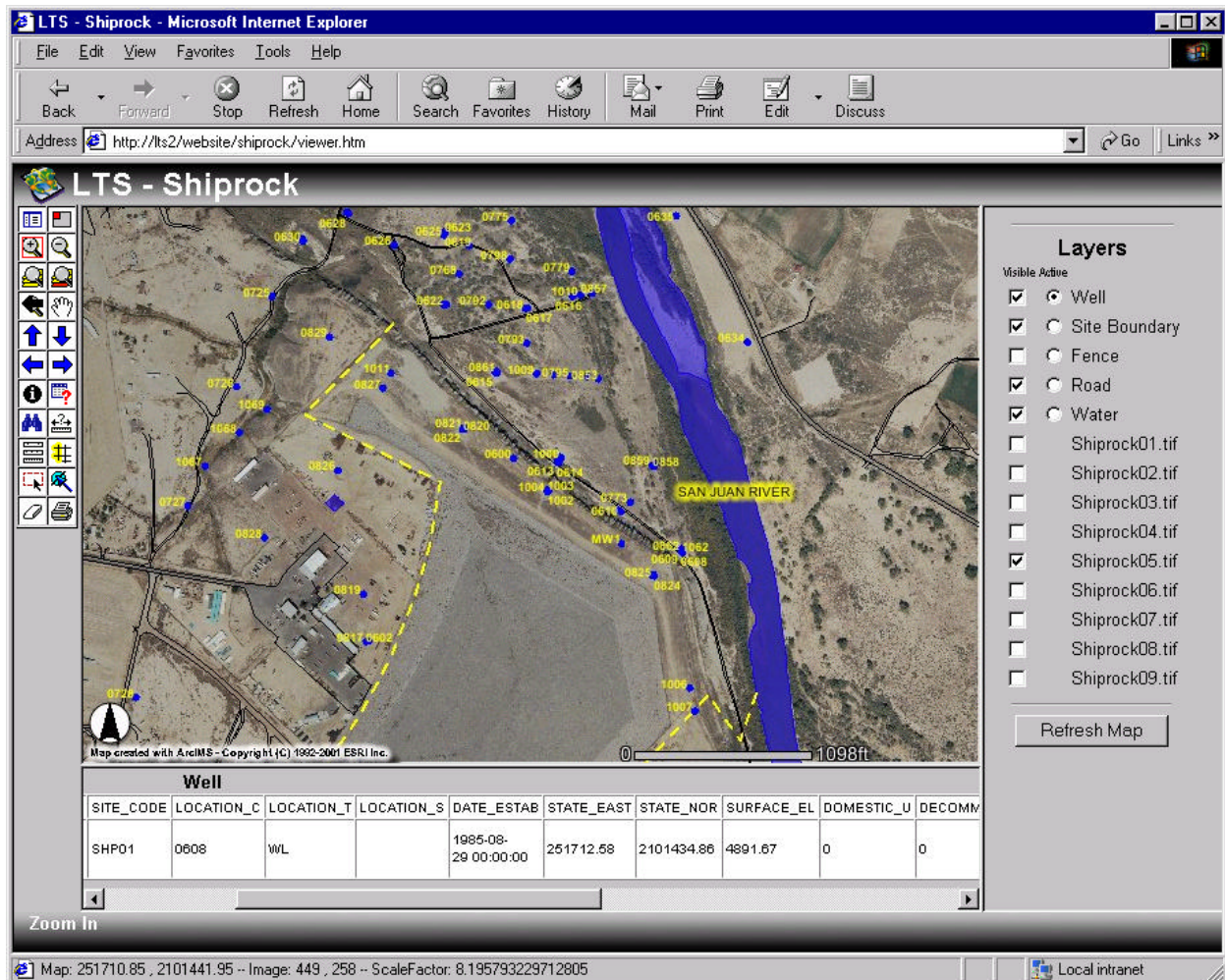
3. An overview of the United States will be displayed, allowing the user to obtain basic information about the site and to select the LTSM Program site of interest.



- Once selected, a regional map of the selected site will be displayed. The user can begin performing standard mapping functions, including panning, zooming, and layer control.



- As the user continues to pan and zoom to a more localized area, additional features will be displayed, including monitoring locations.

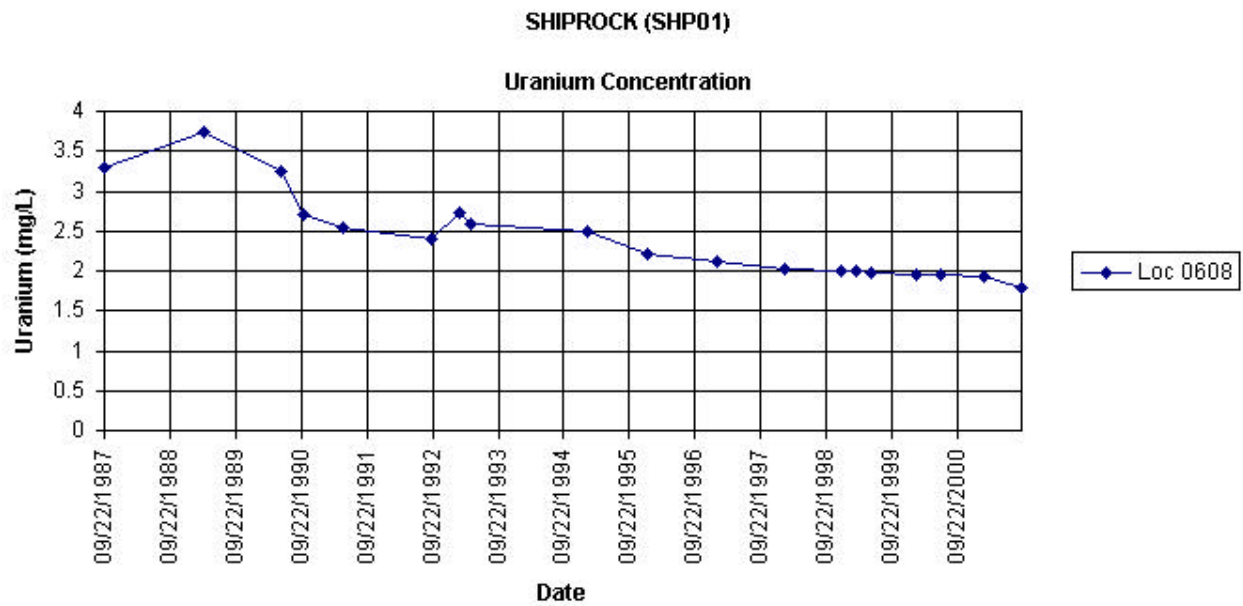


- When the well data layer is active, the identify tool will provide information about the monitoring location.

- Additional tools may allow groundwater quality data to be reported or graphed for the selected location.

GROUND WATER QUALITY DATA BY LOCATION (USEE100) FOR SITE SHP01, SHIPROCK  
 LOCATION: 0608 SE part of floodplain, well nest  
 REPORT DATE: 2/28/2002 8:41 am

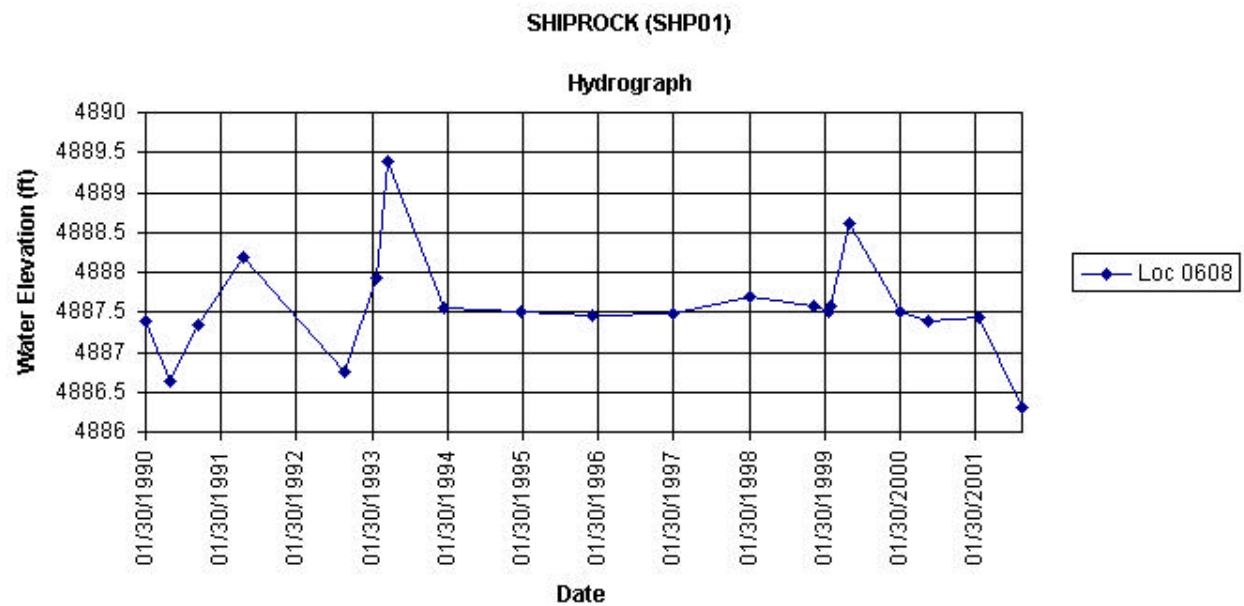
PARAMETER	UNITS	SAMPLE: DATE	ID	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN- CERTAINTY
Uranium	mg/L	06/01/1990	0001	3.25	#	0.003	-
	mg/L	10/07/1990	0001	2.71	#	0.001	-
	mg/L	05/14/1991	0001	2.54	#	0.001	-
	mg/L	09/17/1992	0001	2.4	#	0.002	-
	mg/L	02/21/1993	0001	2.41	#	0.001	-
	mg/L	02/21/1993	N001	2.72	#	0.001	-
	mg/L	04/24/1993	0001	2.22	#	0.001	-
	mg/L	04/24/1993	N001	2.60	#	0.001	-
	mg/L	01/30/1995	0001	2.50	#	0.001	-
	mg/L	01/05/1996	0001	2.21	#	0.001	-
	mg/L	01/05/1996	0002	2.21	#	0.001	-
	mg/L	01/27/1997	0001	2.110	#	-	-
	mg/L	02/03/1998	0001	2.020	#	-	-
	mg/L	12/10/1998	0001	2.010	#	-	-
	mg/L	03/03/1999	0001	2.010	#	-	-
	mg/L	06/03/1999	0001	1.970	#	-	-
	mg/L	02/03/2000	0001	1.950	#	-	-
	mg/L	06/15/2000	0001	1.950	#	0.001	-
	mg/L	06/15/2000	0002	1.960	#	0.001	-
	mg/L	02/13/2001	0001	1.920	#	0.01	-
	mg/L	09/12/2001	0001	1.800	#	0.0025	-



8. Water-level data could also be reported or graphed in a similar manner.

STATIC GROUND WATER LEVELS (USEE700) FOR SITE SHP01, SHIPROCK  
REPORT DATE: 2/28/2002 8:43 am

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
			DATE	TIME			
0608		4893.35	01/30/1990	12:38	5.95	4887.40	
		4893.35	05/30/1990	10:45	6.71	4886.64	
		4893.35	10/07/1990	11:30	6.00	4887.35	
		4893.35	05/14/1991	15:20	5.16	4888.19	
		4893.35	09/17/1992	10:09	6.60	4886.75	
		4893.35	02/22/1993	16:23	5.41	4887.94	
		4893.35	04/20/1993	17:55	3.96	4889.39	
		4893.35	01/10/1994	16:29	5.80	4887.55	
		4893.35	01/25/1995	11:41	5.85	4887.50	
		4893.35	01/03/1996	15:38	5.90	4887.45	
		4893.35	01/22/1997		5.87	4887.48	
		4893.35	02/03/1998		5.66	4887.69	
		4893.35	12/10/1998	14:54	5.77	4887.58	
		4893.35	02/18/1999	09:45	5.84	4887.51	
		4893.35	03/03/1999	17:38	5.78	4887.57	
		4893.35	06/02/1999	08:52	4.75	4888.60	
		4893.35	02/03/2000	17:12	5.85	4887.50	
		4893.35	06/15/2000	09:22	5.97	4887.38	
		4893.35	02/13/2001	13:57	5.91	4887.44	
		4893.35	09/12/2001	10:57	7.05	4886.30	



## **Appendix A**

### **Information Needs Assessment Questionnaire and Questionnaire Recipients**

## ***Appendix A–1. Information Needs Assessment Questionnaire***

### **Long Term Stewardship GIS Pilot Project Information Needs Assessment Questionnaire**

A pilot project through the U.S. Department of Energy/Office of Long Term Stewardship is currently underway at the Grand Junction Office to develop a web-based geographic information system (GIS) for sites currently under stewardship by the DOE Grand Junction Office, Long-Term Surveillance and Maintenance (LTSM) Program.

An information needs assessment is being conducted during the initial phase of this pilot project. As you have a vested interest in one or more of the LTSM Program sites or are currently involved with long-term stewardship activities, your input is of great value to us.

Please take a moment and complete the attached questionnaire. Your response will not only help drive the content, but also the format of the information that is to be made available via the internet later this year. The questionnaire is attached as a Microsoft Word document. Your response can be returned electronically via e-mail or in hardcopy via the fax.

To respond via e-mail:

- Save the attached document
- Enter your responses directly into this document
- E-mail the document to [dan.collette@gjo.doe.gov](mailto:dan.collette@gjo.doe.gov)

To respond via the fax:

- Print the attached document
- Mark up the questionnaire
- Fax the questionnaire to:  
Dan Collette  
MACTEC–ERS  
U.S. Department of Energy/Grand Junction Office  
Fax : (240)526-2631

Please respond by February 12, 2002. If you have any questions regarding this questionnaire or our pilot project, please contact John Gilmore or myself at:

John Gilmore  
DOE LTSM Project Manager  
E-mail: [jgilmore@gjo.doe.gov](mailto:jgilmore@gjo.doe.gov)  
Phone: 970-248-6027

Dan Collette  
MACTEC–ERS  
E-mail: [dan.collette@gjo.doe.gov](mailto:dan.collette@gjo.doe.gov)  
Phone: 970-248-6513

Thanks.

Dan Collette  
Lead, Environmental Data Services  
MACTEC–ERS  
U.S. Department of Energy/Grand Junction Office



# LTS GIS Pilot Project Questionnaire

Respondent Name: \_\_\_\_\_

Company or Agency: \_\_\_\_\_

Title: \_\_\_\_\_

## INFORMATION NEEDS ASSESSMENT

The accessibility of the following information through a web-based GIS is being considered (when applicable for a given site). Please indicate the level of importance and any other comments you may have regarding the information as it applies to you. Comment sections are provided.

The level of importance should be indicated using the following scale:

- n/a – Not applicable for the site(s) in which I am interested
- 1 – not important
- 2 – some importance, but infrequently required
- 3 – important, required sometimes
- 4 – important, commonly required
- 5 – highly important, frequently required

### *1. Standard Surrounding Area and Site Mapping Features*

Feature or Category	Sub-Category	Importance				
		Low			High	
Boundary	Archeological Boundary	n/a	1	2	3	4 5
	Disposal Cell Boundary	n/a	1	2	3	4 5
	City Boundary	n/a	1	2	3	4 5
	County Line/Boundary	n/a	1	2	3	4 5
	Debris Boundary	n/a	1	2	3	4 5
	Dump Boundary	n/a	1	2	3	4 5
	Institutional Control Boundary	n/a	1	2	3	4 5
	Lease Boundary	n/a	1	2	3	4 5
	Parcel Boundary, Doe Acquired Tract or Lease Boundary	n/a	1	2	3	4 5
	Pile, Ore Pile Or Waste Rock Pile	n/a	1	2	3	4 5
	Right-Of-Way Easement for Utilities, Roads And Highways	n/a	1	2	3	4 5
	Site Boundary	n/a	1	2	3	4 5
	Supplemental Standards Boundary	n/a	1	2	3	4 5
	State Line/Boundary	n/a	1	2	3	4 5
	Tailings Boundary	n/a	1	2	3	4 5

Feature or Category	Sub-Category	Importance				
		Low	High			
	Vicinity Properties Boundary	n/a	1	2	3	4 5
	Zoning Boundary	n/a	1	2	3	4 5
Building (or other significant manmade structures)						
	Building Constructed Of Concrete	n/a	1	2	3	4 5
	Building Constructed Of Earth	n/a	1	2	3	4 5
	Building Constructed Of Metal	n/a	1	2	3	4 5
	Building Constructed Of Stone	n/a	1	2	3	4 5
	Building Constructed Of Wood	n/a	1	2	3	4 5
Concrete (pads, sidewalks, curbs, walls, etc)						
		n/a	1	2	3	4 5
Culvert						
	Culvert	n/a	1	2	3	4 5
Dam						
	Dam	n/a	1	2	3	4 5
Fence						
	Chain Link Fence	n/a	1	2	3	4 5
	Gate (Any Material)	n/a	1	2	3	4 5
	Barbed Wire Fence	n/a	1	2	3	4 5
	Wood Fence	n/a	1	2	3	4 5
Grid						
	Local Coordinate System Grid	n/a	1	2	3	4 5
	State Plane Coordinate System Grid	n/a	1	2	3	4 5
Historic feature (of significance)						
		n/a	1	2	3	4 5
Monitoring location (monitoring wells, boreholes, surface sample locations, air monitoring locations)						
		n/a	1	2	3	4 5
Monument						
	Angle Point Corner	n/a	1	2	3	4 5
	Boundary Monument	n/a	1	2	3	4 5
	Bench Mark	n/a	1	2	3	4 5
	Erosion Monument	n/a	1	2	3	4 5
	Aerial Photo Panel	n/a	1	2	3	4 5
	Survey Control Monument Or Survey Control Point	n/a	1	2	3	4 5
	Combined Survey Monument And Boundary Monument	n/a	1	2	3	4 5
	Section Corner, Assumed USGS	n/a	1	2	3	4 5
	Site Marker	n/a	1	2	3	4 5
	Settlement Plate	n/a	1	2	3	4 5
	Triangulation Monument, Assumed USGS	n/a	1	2	3	4 5
	Vertical Angle Bench Mark, Assumed USGS	n/a	1	2	3	4 5
	Witness Corner, Assumed USGS	n/a	1	2	3	4 5



Feature or Category	Sub-Category	Importance				
		Low			High	
Pipe	Conduit	n/a	1	2	3	4 5
	Effluent Pipe	n/a	1	2	3	4 5
	Influent Pipe	n/a	1	2	3	4 5
	Recovery Line	n/a	1	2	3	4 5
	Horizontal Well Pipe Screened Interval	n/a	1	2	3	4 5
	Horizontal Well Pipe	n/a	1	2	3	4 5
Pit	Pit	n/a	1	2	3	4 5
Potentiometric Surface		n/a	1	2	3	4 5
Plume (may be an extent boundary or a set of contours)		n/a	1	2	3	4 5
Riprap	Riprap Location	n/a	1	2	3	4 5
Road	Bridge	n/a	1	2	3	4 5
	Dirt Road (unimproved), includes Trail, 4WD road, ATV access, Driveway, Parking Lot	n/a	1	2	3	4 5
	Gravel Road (improved), includes Driveway, Parking Lot	n/a	1	2	3	4 5
	Asphalt or Concrete Road (improved/paved), includes Driveway, Parking Lot, Airport Runway	n/a	1	2	3	4 5
Railroad		n/a	1	2	3	4 5
Section (section lines, includes section, township, and range info)		n/a	1	2	3	4 5
Slurry Wall		n/a	1	2	3	4 5
Topographic contours		n/a	1	2	3	4 5
Trench		n/a	1	2	3	4 5
Utility	Compressed Air Line, Valve	n/a	1	2	3	4 5
	Electric Line, Control Panel, Junction Box, Power Pole, Transformer, Light Pole	n/a	1	2	3	4 5
	Gas Line, Valve	n/a	1	2	3	4 5
	Storm Drain, Manhole	n/a	1	2	3	4 5
	Sanitary Sewer Line, Manhole, Drain	n/a	1	2	3	4 5

Feature or Category	Sub-Category	Importance				
		Low			High	
	Tank	n/a	1	2	3	4 5
	Telephone Line, Pole, or Junction Box	n/a	1	2	3	4 5
	Water Line, Valve, Pump, Manhole, Hydrant, Drain	n/a	1	2	3	4 5
Vault		n/a	1	2	3	4 5
Vegetation (extent, type)		n/a	1	2	3	4 5
Water (with flow direction when applicable)						
	Canal	n/a	1	2	3	4 5
	Ditch	n/a	1	2	3	4 5
	Manmade Drainage Features	n/a	1	2	3	4 5
	Lagoon, Slough	n/a	1	2	3	4 5
	Lake	n/a	1	2	3	4 5
	Pond, Stock Pond, Frog Pond, Raffinate Pond	n/a	1	2	3	4 5
	Location Of Island In River	n/a	1	2	3	4 5
	Stream, Intermittent Stream	n/a	1	2	3	4 5
Wetland		n/a	1	2	3	4 5

Standard Surrounding Area and Site Mapping Feature Comments:

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## 2. Other LTSM Program Site Surveillance Features

Feature	Description	Importance				
		Low			High	
Access Road		n/a	1	2	3	4 5
Entrance Gate		n/a	1	2	3	4 5
Entrance Sign		n/a	1	2	3	4 5
Groundwater Compliance Monitoring Network		n/a	1	2	3	4 5
Cell Performance Monitoring Network		n/a	1	2	3	4 5
Perimeter Fence		n/a	1	2	3	4 5
Perimeter Signs		n/a	1	2	3	4 5
Other Site Specific Surveillance Feature (please specify)		n/a	1	2	3	4 5

Other LTSM Program Site Surveillance Feature Comments:

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### 3. Raster Information

Feature	Description	Importance				
		Low			High	
Geologic cross-sections		n/a	1	2	3	4 5
Monitoring well lithology and completion logs		n/a	1	2	3	4 5
Photographs (current and/or historic)		n/a	1	2	3	4 5
Aerial or satellite imagery		n/a	1	2	3	4 5
USGS 1:24000 quadrangle map		n/a	1	2	3	4 5

Raster Information Comments:

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#### 4. Attribute Information

Information (to be posted, symbolized, graphed, or in table form)	Description	Importance				
		Low			High	
Access agreement information (land owner, expiration dates, etc.)		n/a	1	2	3	4 5
Lithology information (descriptions, contacts, etc.)		n/a	1	2	3	4 5
Location information (identifier, location type, status, coordinates etc.)		n/a	1	2	3	4 5
Monitoring well construction information (installation date, diameters, screening depths, etc.)		n/a	1	2	3	4 5
Sample and analytical result information		n/a	1	2	3	4 5
Sampling plan information (frequency, constituents, etc.)		n/a	1	2	3	4 5
Water level information		n/a	1	2	3	4 5

Attribute Information Comments:

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**5. Overall Suggestions and Comments (include thoughts on overall desired level of detail and the level in which data presented should be interrupted):**

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Would you like to be notified when the Information Needs Assessment and Web Application Requirements Report is available for download?

☐ Yes, please notify me.

Would you like to participate in future prototype demonstrations of the web-based application?

☐ Yes, please include me on future prototype demonstrations.

## *Appendix A–2. Information Needs Assessment Recipients*

Contact—Type	Company	State
Contractor(ANL)	Argonne National Laboratory	IL
Contractor(DOE/AL)	Applied Sciences Laboratory, Inc.	NM
Contractor(EM-51)	Project Performance Corporation	CO
Contractor(EM-51)	Project Performance Corporation	OR
Contractor(EM-51)	Project Performance Corporation	VA
Contractor(GJO)	MACTEC–ERS	CO
Contractor(GJO)	MACTEC–ERS	UT
Contractor(GJO)	WASTREN, Inc.	CO
Contractor(ID)	BBWI – INEEL	ID
Contractor(ID)	INEEL	ID
Contractor(SRS)	Westinghouse Savannah River Company, LLC	SC
Contractor(VU)	Vanderbilt University	TN
DOE(AL)	U.S. DOE Albuquerque Operations Office / ERD	AL
DOE(CH)	U.S. DOE Chicago Operations Office	IL
DOE(GJO)	U.S. DOE / Grand Junction Office	CO
DOE(ID)	U.S. DOE / Idaho Operations Office	ID
DOE(LTSM/GJO)	U.S. DOE / Grand Junction Office	CO
DOE(LTS/GJO)	U.S. DOE / Grand Junction Office	CO
DOE(LTSM/HQ)	U.S. DOE / Office of Long Term Stewardship	MD
DOE(Oak)	U.S. DOE Oakland Operations Office	CA
DOE(Ohio)	U.S. DOE / Ohio Field Office / MEMP	OH
DOE(ORO)	U.S. DOE Oak Ridge Operations Office	TN
State and Congressional Staff	Colorado State Senator	CO
	Office of the Governor	CO
	Office of U.S. Congressman	CO
	Office of U.S. Senator	CO
Press	San Antonio Express-News	TX
Press	The Daily Sentinel	CO
Regulator	California Department of Toxic Substances Control	CA
Regulator	Colorado Department of Public Health and Environment	CO
Regulator	Missouri Department of Natural Resources	MO
Regulator	Navajo Nation Division of Natural Resources	AZ
Regulator	State of Washington / Department of Ecology / Nuclear Waste Program	WA
Regulator	State of Wyoming Department of Environmental Quality	WY
Regulator	Texas Department of Health / Bureau of Radiation Control	TX
Regulator	U.S. Environmental Protection Agency Region 8	CO
Regulator	U.S. Nuclear Regulatory Commission	DC
Regulator	U.S. Nuclear Regulatory Commission	MD

Contact—Type	Company	State
Regulator	Utah Department of Environmental Quality	UT
Researcher	Desert Research Institute	NV
Researcher	IUP NEETC	PA
Researcher	Sandia National Laboratories/New Mexico	NM
Stakeholder	Cattaraugus County Health Department	NY
Stakeholder	Cherokee Nation	OK
Stakeholder	City of Arvada	CO
Stakeholder	City of Monticello	UT
Stakeholder	City of Oak Ridge	TN
Stakeholder	Energy Communities Alliance	DC
Stakeholder	Fernald Citizens Advisory Board	OH
Stakeholder	Indiana County Planning and Development	PA
Stakeholder	Mesa County	CO
Stakeholder	National Governors Association	DC
Stakeholder	National Mining Association	DC
Stakeholder	Navajo Nation AML/UMTRA	AZ
Stakeholder	Oak Ridge Site-Specific Advisory Board	TN
Stakeholder	Rocky Flats Citizen Advisory Board	CO
Stakeholder	Rocky Flats Coalition of Local Governments	CO
Stakeholder	Snake River Alliance	ID
Stakeholder	Weldon Spring Citizens Commission	MO
U.S. Army	U.S. Army Corps of Engineers	DC



## **Appendix B**

### **Questionnaire Results and Comments**

## ***Appendix B–1. Response Summary Sorted Alphabetically by Feature Description***

The information needs presented in this Appendix were sorted alphabetically by feature description. The rank was determined by summing each priorities multiplied by the number of responses for that priority.

Priority definitions are

- 1 – not important
- 2 – some importance, but infrequently required
- 3 – important, required sometimes
- 4 – important, commonly required
- 5 – highly important, frequently required

<b>Primary Description</b>	<b>Secondary Description</b>	<b>Priority 1</b>	<b>Priority 2</b>	<b>Priority 3</b>	<b>Priority 4</b>	<b>Priority 5</b>	<b>Rank</b>
Access Agreement Information		1	6	6	2	5	64
Access Road		1	1	6	2	12	89
Aerial or Satellite Imagery		1	1	5	7	9	91
Boundary	Archeological Boundary	3	8	5	2	2	52
Boundary	City Boundary	1	1	5	2	12	86
Boundary	County Line/Boundary		2	5	3	11	86
Boundary	Debris Boundary		4		5	9	73
Boundary	Disposal Cell Boundary			2		19	101
Boundary	Dump Boundary		4	2	2	11	77
Boundary	Institutional Control Boundary			8		14	94
Boundary	Lease Boundary	1		8	6	4	69
Boundary	Parcel Boundary, DOE-Acquired Tract or Lease Boundary		1	8	2	12	94
Boundary	Pile, One Pile or Waste Rock Pile		4	1	5	8	71
Boundary	Right-of-Way Easement for Utilities, Roads, and Highways		2	9	2	9	84
Boundary	Site Boundary		2			21	109
Boundary	State Line/Boundary	1	2	10	2	4	63
Boundary	Supplemental Standards Boundary		2	6	4	7	73
Boundary	Tailings Boundary	1	1	2	4	12	85
Boundary	Vicinity Properties Boundary	2	2	3	2	13	88
Boundary	Zoning Boundary	1	8	5	3	3	59
Building	Building Constructed of Concrete	5	1	1	7	5	63
Building	Building Constructed of Earth	5		1	6	5	57
Building	Building Constructed of Metal	6		1	7	4	57
Building	Building Constructed of Stone	5		1	7	4	56
Building	Building Constructed of Wood	6		1	6	5	58
Cell Performance Monitoring Network				3		17	94

Primary Description	Secondary Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5	Rank
Concrete	Pads, Sidewalks, Curbs, Walls, etc.	5	1	8	2	3	54
Culvert	Culvert	4	2	13	1	2	61
Dam	Dam	4	1	3	1	8	59
Entrance Gate		7		1	3	11	77
Entrance Sign		8	3	3	1	7	62
Fence	Barbed Wire Fence	5	1	3	7	2	54
Fence	Chain-Link Fence	5	1	6	4	3	56
Fence	Gate (any material)	5	1	4	6	3	58
Fence	Wood Fence	5	1	7	1	3	47
Geologic Cross Sections			3	9	3	7	80
Grid	Local Coordinate System Grid	1	7	1	6	5	67
Grid	State Plane Coordinate System Grid	1	6	1	3	10	78
Groundwater Compliance Monitoring Network				7	1	14	95
Historic feature	Historic Feature (of significance)		3	10	6	3	75
Lithology Information		1		7	3	8	74
Location Information		1		7	3	10	84
Monitor Location	Monitor Wells, Boreholes, Surface Sample/Air Monitoring Locations		1	1	1	21	114
Monitor Well Construction Information		1	1	2	2	14	87
Monitor Well Lithology and Completions Logs			3	6	1	13	93
Monument	Aerial Photo Panel		1	3	12	3	74
Monument	Angle Point Corner	3	1	9	2	3	55
Monument	Benchmark		1	4	1	13	83
Monument	Boundary Monument		1	8		11	81
Monument	Combined Survey Monument and Boundary Monument	1	1	7	1	9	73
Monument	Erosion Monument		2	8	2	4	56
Monument	Section Corner, Assumed USGS	1	6	2	1	10	73
Monument	Settlement Plate		2	3	2	10	71
Monument	Site Marker		7	2	1	7	59
Monument	Survey Control Monument or Survey Control Point		2	7	5	7	80
Monument	Triangulation Monument, Assumed USGS		2	9	4	2	57
Monument	Vertical Angle Benchmark, Assumed USGS		2	9	5	1	56
Monument	Witness Corner, Assumed USGS	5	2	6	1		31
Other Site-Specific Surveillance Feature				1	1	2	17
Perimeter Fence		5	3	1	2	10	72
Perimeter Signs		5	3	2	3	7	64
Photographs (current and/or historic)		1		3	10	9	95
Pipe	Conduit	1	6	7	3	1	51
Pipe	Effluent Pipe	1	7	4	1	6	61

Primary Description	Secondary Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5	Rank
Pipe	Horizontal Well Pipe	1	6	3	2	5	55
Pipe	Horizontal Well Pipe Screened Interval	1	6	3	5	2	52
Pipe	Influent Pipe	1	6	4	4	3	56
Pipe	Recovery Line	1	9	5	1	1	43
Pit	Pit	3	7	3	3	3	53
Plume	Extent Boundary or Concentration Contours			4	1	18	106
Potentiometric Surface				6	4	11	89
Railroad		6	2	6	2	7	71
Riprap	Riprap Location	2	1	3	7	6	71
Road	Asphalt or Concrete Road (improved/paved), Includes Driveway, Parking Lot, Airport Runway	1	5	4	4	9	84
Road	Bridge	2		12	3	5	75
Road	Dirt Road (unimproved), Includes Trail, 4WD road, ATV Access, Driveway and Parking Lot	1	1	11	4	6	82
Road	Gravel Road (improved), includes Driveway, Parking Lot	1	5	6	3	7	76
Sample and Analytical Results Information			1	4	6	9	83
Sampling Plan Information		1	2	7	7	3	69
Section	Section Lines, Includes Section, Township, and Range Information	6	2	2	1	10	70
Slurry Wall		4		2	3	8	62
Topographic Contours				5	4	14	101
Trench		1	2	4	9	5	78
USGS 1:24000 Quadrangle Map		2	2	4	6	9	87
Utility	Compressed Air Line and Valve	5	10	2	1	1	40
Utility	Electric Line, Control Panel, Junction Box, Power Pole, Transformer, and Light Pole	2	9	3	6	2	63
Utility	Gas Line and Valve	3	9	4	3	3	60
Utility	Sanitary Sewer Line, Manhole and Drain	5	9	3	2	3	55
Utility	Storm Drain Manhole	4	5	2	8	3	67
Utility	Tank	2	4	8	1	6	68
Utility	Telephone Line, Pole, or Junction Box	10	5	4	2	1	45
Utility	Water Line, Valve, Pump, Manhole, Hydrant, and Drain	4	5	6	2	4	60
Vault			1	5	6	4	61
Vegetation		2		14	1	6	78
Water	Canal	1	1	3	12	2	70
Water	Ditch	1	2	4	10	4	77
Water	Lagoon and Slough	4	2	5	8		55
Water	Lake	1		6	2	11	82
Water	Location of Island in River		3	10	1	5	65
Water	Man-made Drainage Features	1	4	5	9	5	85
Water	Pond, Stock Pond, Frog Pond and Raffinate Pond	2	1	6	3	10	84
Water	Stream and Intermittent Stream	1	1	5	2	12	86

<b>Primary Description</b>	<b>Secondary Description</b>	<b>Priority 1</b>	<b>Priority 2</b>	<b>Priority 3</b>	<b>Priority 4</b>	<b>Priority 5</b>	<b>Rank</b>
Water-Level Information		2	2	1	2	14	87
Wetland			2	4	10	5	81

## ***Appendix B–2. Response Summary Sorted by Feature Rank***

This Appendix presents information needs sorted by rank. The rank was determined by summing each priority multiplied by the number of responses for that priority.

Priority definitions are

- 1 – not important
- 2 – some importance, but infrequently required
- 3 – important, required sometimes
- 4 – important, commonly required
- 5 – highly important, frequently required

<b>Primary Description</b>	<b>Secondary Description</b>	<b>Priority 1</b>	<b>Priority 2</b>	<b>Priority 3</b>	<b>Priority 4</b>	<b>Priority 5</b>	<b>Rank</b>
Monitoring Location	Monitor Wells, Boreholes, Surface Sample/Air Monitoring Locations		1	1	1	21	114
Boundary	Site Boundary		2			21	109
Plume	Extent Boundary or Concentration Contours			4	1	18	106
Topographic Contours				5	4	14	101
Boundary	Disposal Cell Boundary			2		19	101
Photographs (current and/or historic)		1		3	10	9	95
Groundwater Compliance Monitoring Network				7	1	14	95
Boundary	Parcel Boundary, DOE-Acquired Tract or Lease Boundary		1	8	2	12	94
Boundary	Institutional Control Boundary			8		14	94
Cell Performance Monitoring Network				3		17	94
Monitor Well Lithology and Completion Logs			3	6	1	13	93
Aerial or Satellite Imagery		1	1	5	7	9	91
Potentiometric Surface				6	4	11	89
Access Road		1	1	6	2	12	89
Boundary	Vicinity Properties Boundary	2	2	3	2	13	88
USGS 1:24000 Quadrangle Map		2	2	4	6	9	87
Water-Level Information		2	2	1	2	14	87
Monitor Well Construction Information		1	1	2	2	14	87
Boundary	County Line/Boundary		2	5	3	11	86
Boundary	City Boundary	1	1	5	2	12	86
Water	Stream and Intermittent Stream	1	1	5	2	12	86
Water	Man-made Drainage Features	1	4	5	9	5	85
Boundary	Tailings Boundary	1	1	2	4	12	85
Boundary	Right-of-Way Easement for Utilities and Roads and Highways		2	9	2	9	84

Primary Description	Secondary Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5	Rank
Road	Asphalt or Concrete Road (improved/paved), Includes Driveway, Parking Lot and Airport Runway	1	5	4	4	9	84
Water	Pond, Stock Pond, Frog Pond and Raffinate Pond	2	1	6	3	10	84
Location Information		1		7	3	10	84
Sample and Analytical Results Information			1	4	6	9	83
Monument	Benchmark		1	4	1	13	83
Road	Dirt Road (unimproved), Includes Trail, 4WD Road, ATV Access, Driveway and Parking Lot	1	1	11	4	6	82
Water	Lake	1		6	2	11	82
Wetland			2	4	10	5	81
Monument	Boundary Monument		1	8		11	81
Geologic Cross-Sections			3	9	3	7	80
Monument	Survey Control Monument or Survey Control Point		2	7	5	7	80
Trench		1	2	4	9	5	78
Vegetation		2		14	1	6	78
Grid	State Plane Coordinate System Grid	1	6	1	3	10	78
Water	Ditch	1	2	4	10	4	77
Boundary	Dump Boundary		4	2	2	11	77
Entrance Gate		7		1	3	11	77
Road	Gravel Road (improved), includes Driveway and Parking Lot	1	5	6	3	7	76
Historic feature	Historic Feature (of significance)		3	10	6	3	75
Road	Bridge	2		12	3	5	75
Monument	Aerial Photo Panel		1	3	12	3	74
Lithology Information		1		7	3	8	74
Boundary	Supplemental Standards Boundary		2	6	4	7	73
Boundary	Debris Boundary		4		5	9	73
Monument	Combined Survey Monument and Boundary Monument	1	1	7	1	9	73
Monument	Section Corner, Assumed USGS	1	6	2	1	10	73
Perimeter Fence		5	3	1	2	10	72
Riprap	Riprap Location	2	1	3	7	6	71
Railroad		6	2	6	2	7	71
Boundary	Pile, One Pile or Waste Rock Pile		4	1	5	8	71
Monument	Settlement Plate		2	3	2	10	71
Water	Canal	1	1	3	12	2	70
Section	Section Lines, Includes Section, Township, and Range Information	6	2	2	1	10	70
Sampling Plan Information		1	2	7	7	3	69
Boundary	Lease Boundary	1		8	6	4	69
Utility	Tank	2	4	8	1	6	68
Utility	Storm Drain Manhole	4	5	2	8	3	67
Grid	Local Coordinate System Grid	1	7	1	6	5	67

Primary Description	Secondary Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5	Rank
Water	Location of Island in River		3	10	1	5	65
Access Agreement Information		1	6	6	2	5	64
Perimeter Signs		5	3	2	3	7	64
Utility	Electric Line, Control Panel, Junction Box, Power Pole, Transformer and Light Pole	2	9	3	6	2	63
Boundary	State Line/Boundary	1	2	10	2	4	63
Building	Building Constructed of Concrete	5	1	1	7	5	63
Entrance Sign		8	3	3	1	7	62
Slurry Wall		4		2	3	8	62
Culvert	Culvert	4	2	13	1	2	61
Vault			1	5	6	4	61
Pipe	Effluent Pipe	1	7	4	1	6	61
Utility	Gas Line, Valve	3	9	4	3	3	60
Utility	Water Line, Valve, Pump, Manhole, Hydrant and Drain	4	5	6	2	4	60
Boundary	Zoning Boundary	1	8	5	3	3	59
Monument	Site Marker		7	2	1	7	59
Dam	Dam	4	1	3	1	8	59
Fence	Gate (any material)	5	1	4	6	3	58
Building	Building Constructed of Wood	6		1	6	5	58
Monument	Triangulation Monument, Assumed USGS		2	9	4	2	57
Building	Building Constructed of Metal	6		1	7	4	57
Building	Building Constructed of Earth	5		1	6	5	57
Monument	Vertical Angle Benchmark, Assumed USGS		2	9	5	1	56
Fence	Chain Link Fence	5	1	6	4	3	56
Pipe	Influent Pipe	1	6	4	4	3	56
Monument	Erosion Monument		2	8	2	4	56
Building	Building Constructed of Stone	5		1	7	4	56
Utility	Sanitary Sewer Line, Manhole and Drain	5	9	3	2	3	55
Monument	Angle Point Corner	3	1	9	2	3	55
Pipe	Horizontal Well Pipe	1	6	3	2	5	55
Water	Lagoon, Slough	4	2	5	8		55
Fence	Barbed Wire Fence	5	1	3	7	2	54
Concrete	Pads, Sidewalks, Curbs, Walls, etc.	5	1	8	2	3	54
Pit	Pit	3	7	3	3	3	53
Boundary	Archeological Boundary	3	8	5	2	2	52
Pipe	Horizontal Well Pipe Screened Interval	1	6	3	5	2	52
Pipe	Conduit	1	6	7	3	1	51
Fence	Wood Fence	5	1	7	1	3	47
Utility	Telephone Line, Pole, or Junction Box	10	5	4	2	1	45
Pipe	Recovery Line	1	9	5	1	1	43
Utility	Compressed Air Line and Valve	5	10	2	1	1	40
Monument	Witness Corner, Assumed USGS	5	2	6	1		31
Other Site-Specific Surveillance Feature				1	1	2	17



## ***Appendix B–3. Questionnaire Response Comments***

### **1. Standard Surrounding Area and Site Mapping Feature Comments or Additional Data Needs**

All of these features are valuable to my work depending on whether the work is assessment or verification. For stewardship, these features all can be valuable. The important thing is that the scenes/layers are available to filter. Stewardship may very well involve going back in and assessing contamination that was left in place, thus all the geological and hydrological features will be needed.

[Colorado Department of Public Health and Environment]

At Mound, deed restrictions pertain to original DOE property. Regardless of how many parcels DOE divided the site into (which MMCIC may subdivide and re-sale). The most important thing is to maintain “corporate memory” of where the original DOE property boundaries are. A GIS-based mapping system, coupled with permanent markers/monuments, is the way DOE’s headed as of February 2002. As the LTS Plan matures, DOE’s plans may change.

[DOE–Ohio]

Grid/coordinate system - Should use national standard UTM NAD83.

[Colorado Department of Public Health and Environment]

Vegetation – How will it be determined?

[Colorado Department of Public Health and Environment]

Need to determine the level of accuracy necessary for these elements. Vicinity properties related to and/or near disposal sites (e.g., Maybell) are high priority for us.

[Colorado Department of Public Health and Environment]

This looks too detailed—looks like an element of CAD/CAM systems. While this is important to you at a site, it is probably too detailed to use on a publicly accessible website. ?

[DOE Office of Long-Term Stewardship]

Grid/coordinate system - Need to have option to select what ever grid is appropriate USGS

National Geodetic survey ? [DOE Office of Long-Term Stewardship]

Vegetation - This can end up getting real complicated and can cost a lot of money; recommend deleting? [DOE Office of Long-Term Stewardship]

The structure needs to be thought out as there are different features for the public versus what you would use for management at a site level, which requires a lot of CAD CAM information. Need to think about the purpose of the information—this will drive the system you use.

[DOE Office of Long-Term Stewardship]

Sandia is wholly contained by Kirtland Air Force Base. Another type of boundary set that might need to be considered is military reservation boundary. In addition, Kirtland Air Force Base is adjacent to an Indian reservation and U.S. Forest Service lands. These need to be considered also. At Sandia, we have categorized our LTSM sites based on their risk status and amount of monitoring and institutional controls that will be needed at each site—this was also not addressed. [Sandia National Laboratories/New Mexico]

Need to add land use, both existing and proposed for site information. Also it would be helpful to have land use and environmental information for areas surrounding DOE facilities. [DOE Office of Long-Term Stewardship (EM-51)]

Public and private water wells  
[Missouri Department of Natural Resources]

## **2. Other LTSM Program Site-Surveillance Features Comments or Additional Data Needs**

Location/identity of any local ranchers, farmers, etc., that perform maintenance for LTSM. [Colorado Department of Public Health and Environment]

Some description of the volume or weight of material disposed. When disposal cell was completed. An estimate of the activity of the material disposed and principal isotopes contributing to the activity. [U.S. Nuclear Regulatory Commission]

Inspection transects - paths that an observer would travel while performing an inspection of a site. (An example would be a transect across a disposal cell looking for differential settlement or cap failures.) [Missouri Department of Natural Resources]

## **3. Raster Information Comments or Additional Data Needs**

These are all important for tracking natural attenuation, etc. [Colorado Department of Public Health and Environment]

Photographs that are linked to a specific location (example would be a picture of a spring and the actual sampling location at that spring annotated on the photo) [Missouri Department of Natural Resources]

Historical photography or scanned maps can be very useful, especially if they depict the activity that caused the contamination. [Argonne National Laboratory]

#### **4. Attribute Information Comments or Additional Data Needs**

The attributes are actually the most important part for us. We think the “dynamic” data are very important.

[Colorado Department of Public Health and Environment]

I did not mark any of this section because much of this will be left up to our regulators as to what information will be available as part of LTSM. We currently do not have any regulatory guidance from our state and Federal regulators indicating what information will need to be presented. We have much of the information mentioned above, but how it might be used as an attribute for an LTSM program has not been determined yet.

[Sandia National Laboratory]

Data should be available such that time series and trend analysis can be done over time using the sampling results information.

[Colorado Department of Public Health and Environment]

Analytical results plotted spatially and the possibility of plotting the results versus time.

[Missouri Department of Natural Resources]

If and where applicable it may be useful to know which wells have dataloggers in them and a list of what parameters the dataloggers are measuring.

[Texas Department of Health]

#### **5. Overall Suggestions and Comments or Additional Data Needs**

Would be helpful to learn how to transition GIS systems from one user (e.g., DOE Mound) to another (e.g., MMCIC, Ohio EPA, U.S. EPA, City of Miamisburg Engineering Department). Transition of hardware? Software? All GIS files? If not all files, which ones are important as “LTS records?” Who pays for transition of GIS system? What if DOE doesn’t think it needs GIS based system (e.g., if have extensive collection of paper maps and sample data).

[DOE Ohio]

Probably the best way to answer this is to tell you how we’d like to use an LTS GIS. First, we’d like to be able to view and print a basic map of each disposal cell and its important features. Second, we’d like to be able to view the dynamic data for the sites. This includes groundwater monitoring data, potentiometric surface maps, inspection data, erosion, settlement, photos, vegetation maps, and also special situations like the pumping data for Estes Gulch.

[Colorado Department of Public Health and Environment]

My concern is that there are three levels of audiences:

1. General Public
2. Regulators and DOE-HQ
3. GJO

Much of the detail, while it is essential for CAD CAM design level systems, is too detailed for the other two audiences--furthermore--with the security concerns of 9-11 you would not be able

to provide much of the information--Can you imagine the heartburn giving out the level of detail on the fences as you have identified would give the security people?

[DOE Office of Long-Term Stewardship]

I am an advocate of making as much data available as possible out to the public. But making that a reality is another thing entirely! The more data you make available, the more it costs to keep up and maintain--and data maintenance is VERY expensive. I am leaning more to keeping the information as simple as possible with links to other more detailed information sources--like reports that have been made into .pdf files on a server, or access to records via the Internet, rather than using the GIS to store and display this information.

[Sandia National Laboratory]

The first is I am not sure you will be able to put any of the information mentioned in the questionnaire on the Internet in the current security lockdown we are experiencing. There has been a general order from the National Security Administration or some group that obviously knows more than we do to remove all mapped information of DOE sites from the Internet. I don't know when this will be relaxed, but it puts a real damper on building map applications. The other thing I wanted to say is I wasn't sure who the audience will be for this information and what level of understanding they will have. At one level there will be decision makers using the data and will need everything you have listed. At the other end you will have users that will not understand half of what is on the list. I have had this same problem on a number of projects where we were building tools for making decisions and not knowing who the ultimate audience will be. We spent all our time thinking of cool problems and solutions, but when it came right down to it what we thought was important didn't mean anything to the ultimate user once we figured out who they were.

[INEEL]

Fundamentally, I believe knowing the physical boundaries of contaminants are crucial, and the political (and thus, legal authority) boundaries are also crucial, as those boundaries will dictate development or land use. Other boundaries (archeological, water features, topo) tend to change over time naturally with erosion/deposition cycles, and so are less reliable (and thus, while not unimportant, are less important). However, boundaries of contaminant-containing objects which are constructed of less "chronologically robust" materials (earthen berms, tin buildings) are extremely important as there is a higher likelihood of their gradual disappearance, leaving little to indicate their presence other than a record of where they were (unlike objects of more robust construction--concrete bunkers--which tend to persevere). The importance of the information is functionally related to the longevity of the object, with the longevity and severity of the hazard factored in somehow. Locational reference data is also critically important, as it provides the relative boundaries.

[DOE-ID; INEEL Long-Term Stewardship Coordinator]

Level of detail needs to be sufficient to test hypotheses, use data for inputs to models, make good maps and reports, and do trend analysis.

[Colorado Department of Public Health and Environment]

I believe that periodic interpretations should be available to the user for the most interesting data. For example, the analytical data for each contaminant of concern could be interpreted in to an

isopleth map and made available as a layer quarterly or annually. Also the trend of COC concentrations versus time could be plotted in a 2D graph for each well or cluster of wells. The level of detail the user sees on screen should be customizable by the user. A simple checkbox that selects layers (groups of attributes) would be useful.

[Missouri Department of Natural Resources]

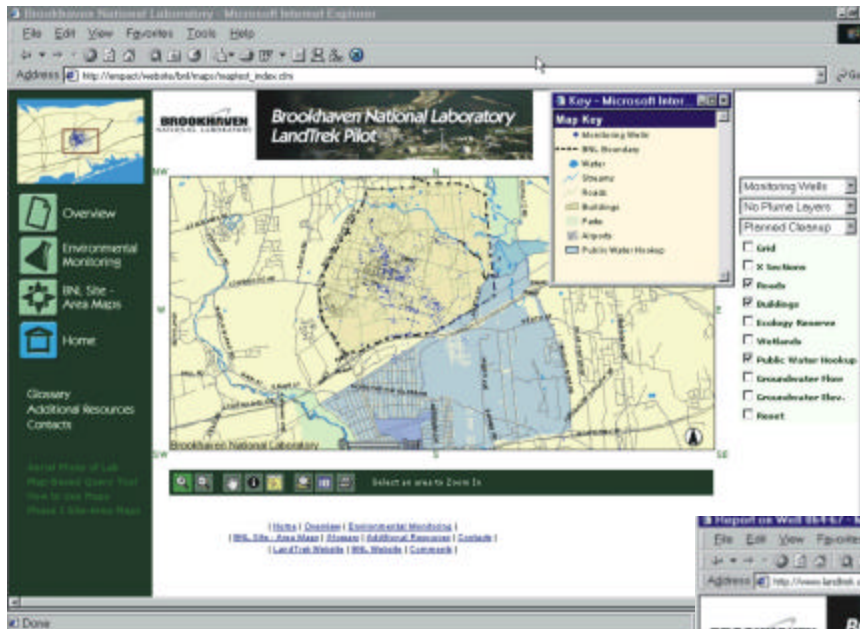
## **Appendix C**

### **Internet-Based GIS Sites**

## Appendix C-1. The Brookhaven National Laboratory Site

Having similar stakeholder communication needs, Brookhaven National Laboratory (BNL) participated in the Landtrek project. Extensive effort was put into identifying stakeholder needs, and the subsequent development of a web-based GIS as one means of communications. The following are screen shots from phase II of the development project. The application architecture includes ESRI's ArcIMS; Macromedia's ColdFusion, Generator, and JRUN; Microsoft's NT, IIS, and SQL Server 2000; and New Atlanta ServletExec. Features of phase II include:

- Dynamic generation of groundwater monitoring maps
- Display of contamination cross-sections
- Zoom-in capabilities to view maps and identify wells to review monitoring data
- Dynamic charting and tabular reporting of monitoring data.



Report on Well 065-03 - Microsoft Internet Explorer

Address: http://www.bnl.gov/LandTrek/Project/landTrek/Report/065-03

Links: [Yahoo! Portal](#) [MSN](#) [Hotmail](#) [MSN](#) [Google](#) [SQL Server BOL](#)

**Brookhaven National Laboratory LandTrek Pilot**

Return to Map | [Well 065-03](#) | [Well 065-04](#) | [Well 065-136](#) | [Well 065-141](#) | [Well 065-142](#) | [Well 065-146](#) | [Well 065-147](#) | [Well 065-148](#) | [Well 065-173](#) | [Well 065-174](#) | [Well 065-175](#)

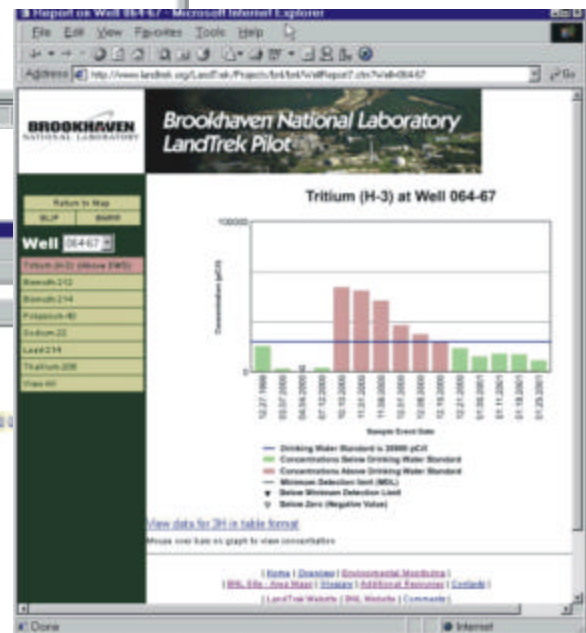
**Well 065-03**

1,1,1,2-Tetrachloroethane Well 065-03 5,000 UGL standard

Date	Concentration (UGL)	Minimum Detection Limit (MDL)
01/27/1999	0.060	0.060
03/26/1999	0.060	0.060
07/19/1999	0.900	0.900
12/16/1999	0.900	0.900
05/02/2000	0.900	0.900
11/08/2000	0.900	0.900

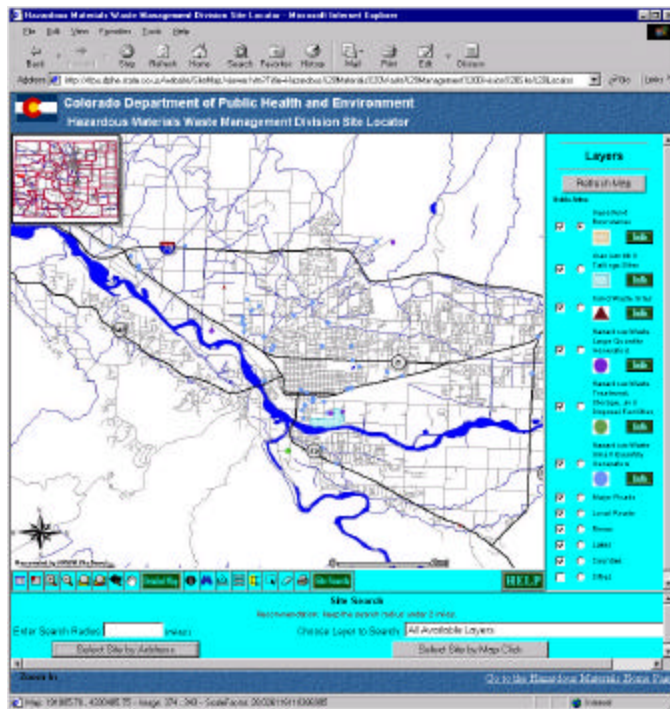
1,1,1-Trichloroethane Well 065-03 5,000 UGL standard

Date	Concentration (UGL)	Minimum Detection Limit (MDL)
01/27/1999	11.40	0.120
03/26/1999	3.200	0.120
07/19/1999	2.200	0.900
12/16/1999	0.700	0.900
05/02/2000	0.900	0.900
11/08/2000	0.900	0.900



## Appendix C–2. Other Environmental Time-Relevant Sites

<http://www.cdphe.state.co.us/hm/hmsitecover.asp>

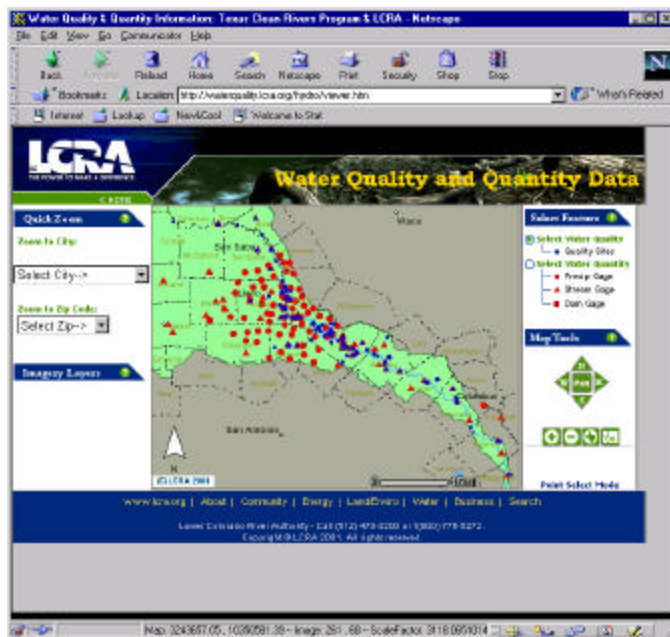


This website provides interactive mapping for groups of facilities regulated or remediated by the Colorado Department of Public Health and Environment/Hazardous Materials and Waste Management Division.

- Allows sites to be searched by radius.
- The identify and search functions return basic information about sites, some of which include link to other websites.

<http://waterquality.lcra.org/>

The LCRA has designed this site to provide water quality and water quantity data collected in the Colorado River basin. The site consists of a map-based interface that allows you to search for

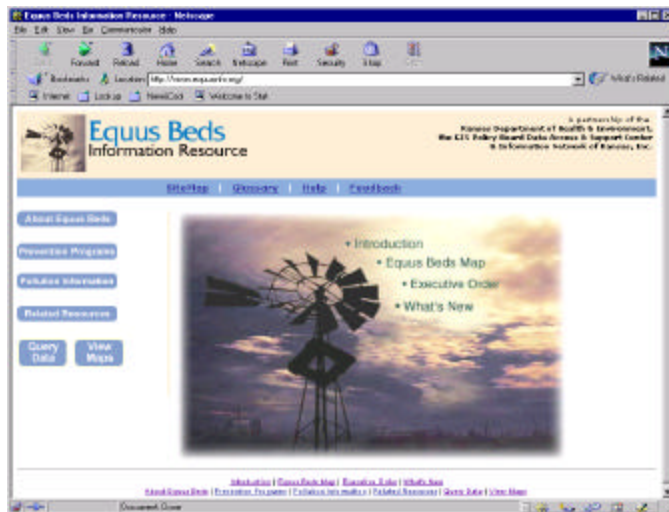


information by geographic location. This information has been designed to help water quality professionals, volunteer monitors, state and federal agencies, and teachers.

- Nice welcome screen with hyperlinks to definitions and questionnaire for user comments and suggestion. Simple to get to map viewer.
- Simple zooming options mapping tools, and overview map toggle.
- Built in help
- Allows water quality data to be displayed in table form and exported for downloading.
- Maps include scale bar, simple (probably adequate) legend, good labeling



<http://www.equusinfo.org>

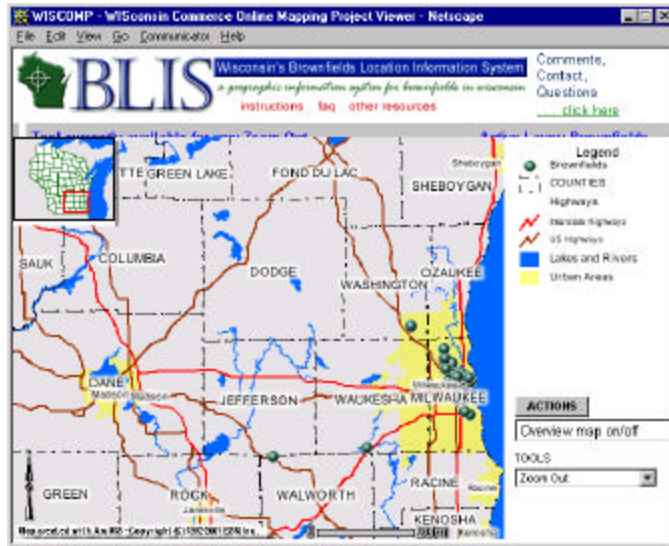


Visit the Equus Beds Information Resource website and learn about threats to a valuable groundwater resource located in central Kansas along with the local, state and federal efforts to protect it. Use the VIEW MAPS link from the site to access customized HTML and Cold Fusion viewers powered by ArcIMS.

- Mapping option well integrated into website
- Site also performs query data

### Appendix C-3. Other Customized ArcIMS Based Sites

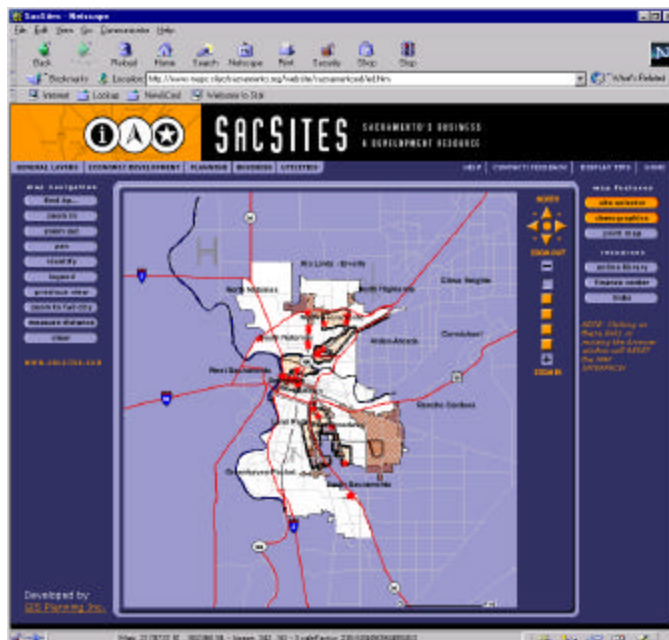
[http://comgis1.commerce.state.wi.us/wiscomp/blis\\_start.htm](http://comgis1.commerce.state.wi.us/wiscomp/blis_start.htm)



The Department of Commerce has developed the Brownfields Location Information System (BLIS) to promote environmental clean-up throughout the state of Wisconsin. BLIS is an Internet mapping service that allows users to locate Brownfield properties available for redevelopment. BLIS is part of the Department of Commerce Internet mapping framework project, WISCOMP.

- Slightly cumbersome welcome screen.
- Demonstrates customization alternatives for mapping tools, overview map, legend, and layer control.

<http://www.maps.cityofsacramento.org/website/sacramentoed/ed.htm>



SacSites is an ESRI ArcIMS application designed to provide enhanced information services to those interested in business or development in Sacramento. SacSites allows users to view, create, and print maps; perform site selection searches; develop custom demographic radius reports; access documents online; and find sources of capital for commercial or business development.

- Demonstrates customization alternatives of user interface including tools, map control, legend, and printing.

## **Appendix D**

### **Long-Term Surveillance and Maintenance Program Sites**

State	Site Name	Category	Residual Contamination <sup>a</sup>
UT	Monticello Disposal Site, Millsite, Vicinity Properties, Peripheral Properties, and Surface and Groundwater	CERCLA	Y
CO	Grand Junction Office (former processing site)	D&D	Y
IL	Site A/Plot M, Palos Forest Preserve (decommissioned reactor/disposal cell)	D&D	Y
NE	Hallam Nuclear Power Facility (decommissioned reactor)	D&D	N
OH	Piqua Nuclear Power Facility (decommissioned reactor)	D&D	N
WV	Parkersburg Disposal Site	NWPA Section 151	N
AZ	Tuba City Disposal Site (former processing site)	UMTRCA Title I	Y
CO	Durango Disposal Site	UMTRCA Title I	N
CO	Grand Junction Disposal Site	UMTRCA Title I	N
CO	Gunnison Disposal Site	UMTRCA Title I	N
CO	Maybell Disposal Site (former processing site)	UMTRCA Title I	N
CO	Mexican Hat Disposal Site (former processing site)	UMTRCA Title I	Y
CO	Naturita Disposal Site	UMTRCA Title I	N
CO	Rifle Disposal Site	UMTRCA Title I	N
CO	Slick Rock Disposal Site	UMTRCA Title I	N
ID	Lowman Disposal Site (former processing site)	UMTRCA Title I	N
NM	Ambrosia Lake Disposal Site (former processing site)	UMTRCA Title I	Y
NM	Shiprock Disposal Site (former processing site)	UMTRCA Title I	Y
OR	Lakeview Disposal Site	UMTRCA Title I	N
PA	Burrell Disposal Site	UMTRCA Title I	N
PA	Canonsburg Disposal Site (former processing site)	UMTRCA Title I	Y
TX	Falls City Disposal and Processing Sites	UMTRCA Title I	Y
UT	Green River Disposal (former processing site)	UMTRCA Title I	Y
UT	Salt Lake City Processing Site	UMTRCA Title I	Y
UT	Salt Lake City Disposal Site	UMTRCA Title I	N
WY	Spook Disposal Site (former processing site)	UMTRCA Title I	Y
NM	Bluewater Disposal Site	UMTRCA Title II	Y
SD	Edgemont Disposal Site	UMTRCA Title II	N
WA	Sherwood Disposal Site	UMTRCA Title II	N

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<sup>a</sup>Contaminant present at site that exceeds regulatory limit.